

WHAT IS CLAIMED IS:

1. A lens array, comprising:

a photosensitive glass plate having a silicate glass composition with at least the
5 following elements:

SiO₂ (65-85wt%)

Li₂O (8-11wt%)

Al₂O₃ (2-7wt%)

10 CeO₂ (0.01-0.05wt%) and including an amount of a photosensitive agent, the photosensitive agent comprised of either Au or Ag and/or combinations thereof, the amounts each being:

Au (0.005-0.015wt%)

15 Ag (0.0005-0.005wt%)

wherein when the photosensitive glass plate is subjected to an exposure step, a heat treatment step and a prolonged ion exchange step it becomes a glass composite plate that includes a plurality of glass regions which are lenses and at least one opal region located around the lenses.

20 2. The lens array of Claim 1, wherein said glass composite plate has clear, colorless lenses.

25 3. The lens array of Claim 1, wherein said glass composite plate has lenses formed therein which have enhanced sag heights.

4. The lens array of Claim 1, wherein said photosensitive glass plate includes only silver as the photosensitive agent.

30 5. The lens array of Claim 1, wherein said photosensitive glass plate includes only gold as the photosensitive agent.

6. The lens array of Claim 1, wherein said photosensitive glass plate has a composition selected from the group of compositions listed in TABLES 3A-3B.

7. The lens array of Claim 1, wherein said prolonged ion exchange step is used to increase the sag height of the lenses by immersing the glass composite plate into a KNO_3 molten salt bath at 500°C for times on the order of 64 hours.

8. The lens array of Claim 1, wherein said silicate glass composition of said photosensitive glass plate has the following elements:

Na_2O (0-10wt%)
 K_2O (0-8wt%)
 ZnO (0-5wt%)
 Sb_2O_3 (0-5wt%); and
 KNO_3 (0-5wt%).

9. A method for making a lens array, said method comprising the steps of:
placing a photomask over a non-exposed photosensitive glass plate having a silicate glass composition with at least the following elements:

SiO_2 (65-85wt%)
 Li_2O (8-11wt%)
 Al_2O_3 (2-7wt%)
 CeO_2 (0.01-0.05wt%)

and including an amount of a photosensitive agent, the photosensitive agent comprised of either Au or Ag and/or combinations thereof, the amounts each being:

Au (0.005-0.015wt%)
Ag (0.0005-0.005wt%);

exposing the photomask and selected regions in the non-exposed photosensitive glass plate to an ultraviolet light;

heating the exposed photosensitive glass plate to form therein a plurality of glass regions and at least one opal region; and

ion exchanging the heated photosensitive glass plate to create said lens array, wherein said lens array is a glass composite plate where the plurality of glass regions are lenses and the at least one opal region is located around the lenses.

10. The method of Claim 9, wherein said lens array has clear, colorless lenses.

11. The method of Claim 9, wherein said lens array has lenses formed therein which have enhanced sag heights.

12. The method of Claim 9, wherein said photosensitive glass plate includes only silver as the photosensitive agent.

13. The method of Claim 9, wherein said photosensitive glass plate includes only gold as the photosensitive agent.

14. The method of Claim 9, wherein said photosensitive glass plate has a composition selected from the group of compositions listed in TABLES 3A-3B.

15. The method of Claim 9, wherein said ion exchange step is used to increase the sag height of the lenses by immersing the glass composite plate into a KNO_3 molten salt bath at 500°C for times on the order of 64 hours.

16. The method of Claim 9, wherein said silicate glass composition of said photosensitive glass plate has the following elements:

Na_2O (0-10wt%)
 K_2O (0-8wt%)
 ZnO (0-5wt%)
 Sb_2O_3 (0-5wt%); and
 KNO_3 (0-5wt%).

17. A photosensitive glass plate having a silicate glass composition with at least the following elements:

SiO_2 (65-85wt%)

Li₂O (8-11wt%)

Al₂O₃ (2-7wt%)

CeO₂ (0.01-0.05wt%)

and including an amount of a photosensitive agent, the photosensitive agent comprised of
 5 either Au or Ag and/or combinations thereof, the amounts each being:

Au (0.005-0.015wt%)

Ag (0.0005-0.005wt%).

10 18. The photosensitive glass plate of Claim 17, wherein said silicate glass composition has the following elements:

Na₂O (0-10wt%)

K₂O (0-8wt%)

ZnO (0-5wt%)

15 Sb₂O₃ (0-5wt%); and

K₂O (0-5wt%).

19. The photosensitive glass plate of Claim 17, wherein said photosensitive glass plate is subjected to an exposure step, a heat treatment step and a prolonged ion exchange
 20 step and becomes a glass composite plate that includes a plurality of glass regions which are lenses and at least one opal region located around the lenses.

20. The photosensitive glass plate of Claim 19, wherein said glass composite plate has clear, colorless lenses.

25 21. The photosensitive glass plate of Claim 19, wherein said glass composite plate has lenses formed therein which have enhanced sag heights.

22. A photosensitive glass plate having a silicate glass composition with at least
 30 the following elements:

SiO₂ (65-85wt%)

Li₂O (8-11wt%)

Al₂O₃ (2-7wt%)

CeO_2 (0.01-0.05wt%); and
 Au (0.005-0.015wt%).

23. The photosensitive glass plate of Claim 22, wherein said silicate glass
5 composition has the following elements:

Na_2O (0-10wt%)
 K_2O (0-8wt%)
 ZnO (0-5wt%)
 Sb_2O_3 (0-5wt%); and
10 KNO_3 (0-5wt%).

24. A photosensitive glass plate having a silicate glass composition with at least
the following elements:

SiO_2 (65-85wt%)
15 Li_2O (8-11wt%)
 Al_2O_3 (2-7wt%)
 CeO_2 (0.01-0.05wt%); and
 Ag (0.0005-0.005wt%).

20 25. The photosensitive glass plate of Claim 24, wherein said silicate glass
composition has the following elements:

Na_2O (0-10wt%)
 K_2O (0-8wt%)
 ZnO (0-5wt%)
25 Sb_2O_3 (0-5wt%); and
 KNO_3 (0-5wt%).